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West Europe Report

SCIENCE AND TECHNOLOGY

No. 20

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CONTENTS

FEDERAL REPUBLIC OF GERMANY

Energy Research Projects in Developing Countries
(FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT, 20 Mar 80)... 1

Status of Nonnuclear Energy Sources in FRG Outlined
(FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT, 1 Mar 80)... 4

Government Supports Development of Wind-Energy Technology
(FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT, 17 Mar 80)... 7

Dornier To Launch New Utility Aircraft
(NORTH SEA OBSERVER, 24 Mar 80)....................... 9

FRANCE

France To Reinstitute Domestic Oil Exploration
(L'INDUSTRIE DU PETROLE GAZ-CHIMIE, Nov 79)........... 10

New Interministerial Mission on Information
(L'INDUSTRIE DU PETROLE GAZ-CHIMIE, Nov 79)........... 11

ITALY

Flexible Industrial Robots Used in Automobile Industry
(FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT, 17 Mar 80)... 12

SWEDEN

New Process for Less Expensive Ethanol
(Jan Ohlsson; SVENSKA DAGBLADET, 29 Feb 80)........... 15

ENERGY RESEARCH PROJECTS IN DEVELOPING COUNTRIES

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German
20 Mar 80 p 7

[Text] Frankfurt, 19 March--The Federal Ministry for Research and Technology and the Federal Ministry for Economic Cooperation increasingly promote projects in the area of nonnuclear energy research, particularly in the realm of solar and wind energy and, closely connected with this, in desalination, utilizing solar energy. All of this is done under the motto "technology for developing countries." In response to a parliamentary inquiry by the CDU/CSU the federal government has given a survey of its policies concerning the promotion of technology for developing countries (Bundestag exhibit 8/3625). This response also enumerated all of the projects in the area of "technology for developing countries" which have so far been approved by both chambers. Few of these projects have been completed so far, because the major effort was begun only a few years ago.

Those projects which are designed to develop renewable energy sources are given priority. According to their reports the two ministries cooperate closely. The Federal Ministry of Economic Cooperation makes extensive use of the German Society for Technical Cooperation (GTZ) in connection with project evaluation, consideration of applications and continuous supervision of the projects. In this process, GATE (German Appropriate Technology Exchange) -- which was established jointly by the two ministries as part of the Society for Technical Cooperation in an effort to promote transfer of technology -- cooperates with the experts within the Society for Technical Cooperation. Persons in the private sector who are interested in becoming involved in governmentally sponsored technology projects in the developing countries should thus get in touch with that agency. Additionally, under the auspices of the Ministry for Research and within the framework of scientific-technological cooperation, there are also the project carriers and the major research institutes with their international offices. The specific projects are carried out by the project carriers, who in turn are tied in with the Ministry for Research.

The approval of state funds for the various projects is subject to differing management rules. The Ministry for Research applies the "Management Rules for Research and Development Projects Applicable to Recipients of Accountable

Expenditures, for Entrepreneurs in the Private Sector," as well as appropriate rules for the utilization and accounting of funds. The technical pilot projects of the Ministry for Economic Cooperation are carried out under the terms applicable for technical cooperation. All this is to remain unchanged in the future, according to the two ministries. That is to say, the entire process of providing governmental funds in this area is burdened with a considerable bureaucratic machinery.

The projects in the realm of nonnuclear energy sources may be summarized as follows:

Ministry for Research.

Presently the Ministry for Research supports 16 solar energy projects, 3 sea water desalination projects and 1 wind energy project in various countries, with a total of about DM 18 million in governmental aid. Emphasis in connection with solar energy is placed on providing relatively small solar power plants such as, for example, a 10 kw solar power plant in Egypt in cooperation with the National Research Council of Egypt. A similar power plant is being supported in Greece in cooperation with the government of Greece and AEG [Allgemeine Elektrizitaetsgesellschaft]. The development of solar driers as well as the development of a solar village are to be continued in connection with this project. Another 10 km solar generator and a teststand for flat collectors are being supported in India.

In summary it can be said concerning these state supported projects that from the private sector the following firms, functioning as major state supported research institutions are involved: Dornier, AEG, MBB and Kraftanlagen Heidelberg. Emphasis is placed on the decentralized production of electricity with the aid of solar energy and on energy supply for individual villages as, for example, in Indonesia, Greece and Mexico.

Federal Ministry for Economic Cooperation.

In connection with its technology program for the developing countries this ministry alone supports 27 projects with state funds amounting to DM 34.2 million. In addition to small solar power plants, the agency is particularly interested in promoting the use of wind energy.

A major project being supported by the above ministry (BMZ) is the utilization of wind energy and alternate energy sources on Malta. DM 6.5 million are earmarked for this project alone. Wind energy, abundantly available on Malta, is to be exploited as much as possible. The plans call at least for a system by which wind energy will be used to pump sea water into elevated water reservoirs in order to supply to the power grid electricity via a hydroelectric power plant. Concrete plans, however, have not yet been completed for this project.

A total of three projects for the utilization of biogas are being supported by the BMZ in the developing countries at the cost of DM 1.7 million in state aid. A specific program which will include projects in a large number of countries has been started by the BMZ. Through this program for the utilization of renewable energy sources, new techniques for such utilization are to be employed, adapted and tested in 10 specific countries. New project carrier organizations are being created for the purpose of examining the suitability of the needed apparatus and techniques. They will also handle the training and deployment of the necessary personnel. Persons interested in these projects should get in touch with the above mentioned agency GATE. Further interesting projects in connection with this aid program include projects for solar cooling and drying, as well as the construction of small hydroelectric power plants.

Even the wood burners are experiencing a come back, and for this purpose wood waste provides the needed bio substance. Also of interest is a pyrolysis gas generator utilizing coconut shells. A wood burner which will utilize coconut shells is being supported on the Seychelles at the cost of DM 400.000. This project is intended as a contribution to provide for the energy needs of the Seychelles.

Joint Projects.

An additional nine projects, primarily in industry, are presently being supported by both ministries with DM 3.2 million in state funds. These are primarily solar and wind energy projects with an emphasis on small plants. This also includes, for example, a project for the production of ethanol utilizing raw plant waste matter, for which the Flick subsidiary company PVC received DM 890,000 in support. Dornier is one of the few firms which, under contract with both ministries, has researched the utilization of energy from wave action, in particular for developing countries.

In summary it can be noted that at present about 60 projects for the promotion of renewable energy sources are being carried out by the FRG in the developing countries. Together the two ministries provide through these projects about DM 60 million for research and development as well as economic cooperation. In the case of some projects it is not quite clear yet how much aid will be required. Based on an average of 2 years per project, the annual support for nonnuclear projects in the developing countries can be calculated at DM 30 million. This is to say 30 percent of government aid for research into new renewable energy sources is earmarked for projects in the developing countries.

9410
CSO: 3102

FEDERAL REPUBLIC OF GERMANY

STATUS OF NONNUCLEAR ENERGY SOURCES IN FRG OUTLINED

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German 1 Mar 80 p 5

[Text] In the framework of the nonnuclear energy research program of the Federal government a key point is the promotion of coal research and the exploration of other primary fossil energy sources. Of the total state research funds in the period from 1974 to 1978 for economic energy use, coal and other primary fossil energy sources and new energy sources, amounting to DM 1.9 billion, 68.4 percent were for coal and other primary fossil energy sources. The most recent summary data about these research support measures are available for 1978. The following, therefore, highlights the key issues in respect to the support measures.

On the basis of the data in the 1978 annual report of the Juelich energy research project directorate there are, in the form of a summary, the following research expenditures for coal and primary fossil energy sources: state support by the Ministry for Research in 1978 for coal and other primary fossil energy sources, in millions of DM:

Subject Area	Total Costs	State Support	Allocation 1978
1. Overall support	2346	1304	319
Of this,			
2.1 Production of electricity from coal	568,9	265,4	64,3
2.2 Production of gas from coal ...	285,7	211,4	74,3
2.3 Coal liquefaction	131,1	106,7	8,8
2.4 Production of coke and direct combustion	152,3	87,8	24,2
2.5 Systems of heading and working	1071,1	545,9	125,5
2.6 Preparation	57,1	28,9	3,6
Total for coal research	2265,2	1246,1	302,7
3. Petroleum and natural gas	69,4	51,1	13,5
4. Oil shale	11,1	7,4	2,9

This shows that coal research is clearly the main issue in state research measures for primary fossil energy sources because over 95 percent of the state research allocations for this sector are spent for coal research. The focal point in state coal research is in the sector of mining technology, specifically in heading and working systems. Further development and testing of new heading systems is directed at extensively increasing the header advance. In the future this should open up new deposits more rapidly and more economically. These developments serve not least to make the work easier and also to increase the safety of the heading crews. A further project is the development of new working equipment. New composite equipment for coal mining has as its purpose further improvement of machine facilities and processes for mining coal, face conveying and face support, in spite of changing requirements because of different seam stratification and mountain conditions.

In this research on heading and working systems there is also support for coal preparation, yet only on a relatively modest scale. An additional second important key area in the coal research program is the sector having to do with the production of electricity from coal, followed by the production of gas from coal. With the research efforts it is anticipated that new processes for producing electricity from coal will be possible; in connection with this the emission of pollutants is, of course, to be reduced. In addition to the decline in the volume of investment for coal power plants there is also supposed to be increased efficiency. Primarily the development of the fluid catalyst furnace appears to promise success. It makes possible smaller coal power plants with the same output and thus lower specific investment costs. Moreover, the emission of pollutants is considerably reduced. By adding lime it is possible to achieve simple and cost-favorable desulphurization in the combustion chamber. A prototype plant is currently under construction. At the same time, in a joint program of the International Energy Agency, an experimental plant is being built in which the production of steam to operate a steam turbine is to be tested and optimized.

In respect to the production of gas various processes are being supported which, as part of the new coal improvement program of the Federal government, are being primarily developed further into big plants. This coal improvement program of the Federal government, in which the further development of 14 larger coal improvement projects is being pursued, ... the measures first supported in the coal research program for gasification and liquefaction of coal are being continued [sic]. The research endeavors having to do with the production of coke and direct combustion are being continued, independent of these coal improvement programs of the Federal government. The details of the projects can be derived from the data in the annual report of the project director (Project Director, Energy Research, Juelich Nuclear Research Plant, P.O. Box 1913, 5170 Juelich).

A key point in the state's support measures in the petroleum and natural gas sectors is the search for petroleum and natural gas in the FRG and the development of new methods to discover deposits. In addition, several projects are being supported in order to increase the yield of existing oil deposits in the FRG. The oil reserves of 68 million barrels presently known to be in the FRG will be doubled by new discoveries and better exploitation. Even in the case of natural gas this is expected to produce success, primarily in the discovery of new natural gas deposits in the FRG.

The work presently being done on the use of oil shale in the FRG is concentrated on two projects whose industrial use appears to be possible the soonest. The first is the project of the Braunschweig Coal Mining Works and the VEBA [United Electricity and Mining Corporation]-Chemie for the use of oil shale near Schandelah and the second is the project of the Portland Cement Works in Dotternhausen for the use of the oil shale present there. The Lurgi Co is working on a 5.7 million project in the construction of an experimental plant for extracting oil shale. By developing the FRG's oil shale it would be possible to double once again the guaranteed petroleum reserves, amounting to 70 million barrels. Beyond that the experiences in the use of oil shale domestically can be used in the export sector of these plants, primarily in countries with substantial oil shale deposits such as, for example, Canada, the United States and Venezuela.

12124
CSO: 3102

FEDERAL REPUBLIC OF GERMANY

GOVERNMENT SUPPORTS DEVELOPMENT OF WIND-ENERGY TECHNOLOGY

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German 17 Mar 80 p 5

[Text] Within the framework of the state's promotion of research for new energy sources, there is support primarily from the Ministry for Research and Development for a number of research and development projects relating to the use of wind energy. According to information from the Federal government given in response to an inquiry in the Bundestag, research and development projects concerning the use of wind energy are being promoted by the Federal government principally from the following two points of view:

--development and testing of large wind turbines for integration into the public power supply,

--adaptation of small wind energy converters for special applications.

In respect to developing large wind turbines the focus is on problems of durability, operational safety and economy. The goal in this is to be able to offer the Laender that have appropriately high wind-energy potential usable equipment for supplying public electricity. At this early stage of development the question of marketing does not come up. On the other hand, the Federal government normally does not spend research and development funds for the construction of small wind-energy plants since the problems of such equipment vis-a-vis large plants are relatively modest. In connection with small wind-energy plants the projects being promoted by the Ministry for Research are primarily concerned with developing and testing possible designs for use and storage, suitable methods of measuring and carrying out comparison tests.

The smoother expansion of the use of small wind-energy plants is, in the view of the ministry, first and foremost a problem of competitiveness with other equipment, but it is also a problem of introducing them to the market. In the view of the ministry, assistance here, in the form of subsidies, might be possible for acquiring these plants, for example, in the framework of the modernization and energy saving law, similar to those for other primary energy saving measures. This possiblity is to be considered in the upcoming amended version of the law. The Ministry for Research does, of course, refer to the fact that, independent of the problems relating to securing approval, the use of wind-energy plants can be efficient only in regions where the wind conditions are favorable, since, as a rule, the energy density of the wind is far below that of solar energy.

The minister for town planning in the Bundestag provided information relating to the obstruction of wind energy because of legal problems. According to the current law in respect to project planning, the building of wind power plants is definitely possible. Thus, according to Article 30 of the Federal Construction Law, wind power plants are permissible in master plan areas as auxiliary plants in so far as the master plan does not contain any applicable determinations. However, they must not produce unreasonable disruptions and inconveniences or have a negative effect on the nature of the locale and landscape. Beyond that, consideration must also be given to the fact that environmental damage is possible from possible extensive use in heavily populated residential areas (for example, disruptions in television reception, noise immissions, decreased reduction in the concentrations of pollutants as a result of worse natural ventilation).

Wind power plants inside built-up sections of a locale must also be similarly judged. In the opinion of the minister for town planning this is a question of the specifics in each individual case. Wind power plants are likewise permissible in the external district if there is no negative impact on public interests. In the view of the Federal government it is not expected at present that there will be any changes in the law. Whether and to what extent there should be special relaxation in the rules in the future in respect to licensing wind power plants requires careful examination. The Federal government emphasizes that for the purpose of saving energy modern equipment should be used. On the other hand, amendments to the law should be introduced only on the assumption that the current law is really in need of change. Thus, the first action should be to gather experiences. The minister for construction is, in this question, in close contact with the ministers of the Laender who are responsible for construction. An expert opinion has been rendered within the framework of the Federal government's promotion of new equipment. This expert opinion about the use of wind power plants should clarify which problems specifically related to securing approval will occur in connection with the installation of wind power plants in the FRG.

12124
CSO: 3102

DORNIER TO LAUNCH NEW UTILITY AIRCRAFT

London NORTH SEA OBSERVER in English 24 Mar 80 p 19

[Text]

Dornier, the German aircraft manufacturer that has enjoyed considerable success with utility aircraft since the mid-50s is extending its range of aircraft with several new types.

This year the company is launching a new version of the Do 28 Skyservant, with Pratt & Whitney turboprop engines. Designated Turbo-Skyservant D-6, it is the result of two years of testing of the TurboSky D-5X prototype, and complements the twin piston engined Skyservant D-2 which has been in service since 1966.

Dornier has also embarked on a development programme for two further aircraft. These are reported to be a 15-seater commuter, feeder and cargo aircraft developed under the project designation Do 28 E1, and a 19-seat version for the same mission range, designated Do 28 E2. Both aircraft will use components from the well-proven Skyservant, and as powerplant are envisaged two Garrett AiResearch TPE 331 or two Pratt & Whitney PT 6 turboprop engines.

A new technology wing has been flight tested on a modified Skyservant since the middle of last year, and will be incorporated into the design of the two new types which are expected to make their operational debut in 1981.

Dornier will then be supplying a family of utility aircraft catering for a market ranging from 10 to 20-seat capacity, and from conventional piston engine types to turboprop aircraft.

CSO: 3102

FRANCE TO REINSTITUTE DOMESTIC OIL EXPLORATION

Paris L'INDUSTRIE DU PETROLE GAZ-CHIMIE in French Nov 79 p 50

[Text] Minister of Industry Andre Giraud has disclosed to the press the broad outlines of the "French Hydrocarbons" program, which calls for the resumption of petroleum exploration in the national territory and the reinforcement of the technological progress of the French petroleum industry.

In 1981 a total of 1 billion francs will be allocated to research (compared to 430 million francs in 1979) and exploration will be resumed in Nord Department, Pas de Calais Department, the Parisian Basin, the Aquitanian Basin, Alsace, the Iroise Sea, eastern Manche Department and the Gulf of Gascony.

In the domain of research and development, the strategy of the petroleum groups during the next few years is designed to facilitate the more efficient recovery of petroleum, exploitation of the heavy crudes and bituminous shales, and mastery of the techniques of exploration and production of offshore petroleum and gas.

Governmental support of these programs will take the form of an increase in the aid extended by the Fund for the Support of Hydrocarbons. In 1980 investments will total 700 million francs as against 490 million francs in 1979.

10998
CSO: 3100

NEW INTERMINISTERIAL MISSION ON INFORMATION

Paris L'INDUSTRIE DU PETROLE GAZ-CHIMIE in French Nov 79 p 53

[Text] The government has approved by decree (No 79-805, 19 September 1979) the creation of an Interministerial Mission on Scientific and Technical Information (MIDIST).

This mission has been placed under the Secretariat of State to the Prime Minister in Charge of Research and will be responsible for:

1. Recommending--to the government--guidelines for national policy in the domain of scientific and technical information.

2. Coordinating the action of the concerned ministries.

3. Encouraging all action that is of common interest and calculated to strengthen the resources of scientific and technical information.

4. Studying--and recommending to the government--guidelines for a policy on scientific information designed to improve and strengthen French scientific and technical publications.

The mission was created pursuant to decisions taken by the Council of Ministers on 4 October 1978 which retained the principle of a loose interministerial structure charged with establishing the basic policy orientations to be followed in the field of scientific and technical information; ensuring the coherent implementation of these orientations; promoting new activities in the field of scientific and technological information; and supporting--on a continuing basis--large-scale activities of common interest.

This structure will have at its command a system of flexible financial procedures and a team of specialists who are in contact with the world of research and industry and able to delegate the responsibility for achievement of these goals to the best possible teams.

The mission will take over--and strengthen--the interministerial functions of the National Bureau of Scientific and Technical Information (under the Ministry of Industry), which has been abolished.

A cell will be established within the Ministry of Industry to ensure the continuity and development of the information activities carried out in the establishments and organizations placed under its direction.

10992
CSO: 3102

FLEXIBLE INDUSTRIAL ROBOTS USED IN AUTOMOBILE INDUSTRY

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German 17 Mar 80 p 5

[Article by hh: "Flexible Industrial Robots Do the Dirty Work in the Automobile Industry"]

[Text] Frankfurt, 16 March--New systems are penetrating the field of automating transport and production processes in the automobile industry. These new systems obviously correspond to the requirements of future-oriented movement of materials, production and assembly systems. Automatic production processes no longer have to be single-belt assembly lines. The possibilities of modern control techniques are helping to develop ever more complicated processes and in this way make comparatively large investments feasible; the result is production systems which can be used simultaneously for different products. More humane working conditions are also being created by integrating flexible industrial robots into existing assembly line systems as is clarified by the following applied examples.

The chassis frames by Fiat in the Rivalta and Cassino works are now totally welded by robots without any workers. Robots programed to weld each chassis on its own are no longer a unique sight. Various models on the same production line that are processed by completely automated means but not in sequential order and in different quantities represent a new development internationally, according to Fiat officials. Robogate, as this system is called, which is composed of the robots and the gates--the gate welding stations--was designed and implemented as a result of 2 years of intensive cooperation on advancing technological capacities in the automobile industry by Digitron AG in Bruegg (Switzerland), a subsidiary of the Swiss Schindler Group, and its Italian licensed partner Comau Industriale (Turin).

The capacities of the Fiat systems constitute a daily production of 2,000 coaches. Eight different models can be produced simultaneously whereby the conversion to other types can be performed rapidly and without serious problems. In comparison, the rigid, conventional systems of a production process were fixed for a single model. Freely programable welding robots, a fully automatic robocarrier transport system (inductively guided, driverless floor transport vehicle), and a computer with advanced software are the three elements making this flexibility possible.

According to Fiat, 70 percent of the basic investments are not tied to models in the case of robogate and can be reused again and again. All the jobs formerly located in noisy and dirty surroundings have now disappeared completely. But for this, a whole series of new jobs were created which provide a greater degree of responsibility for operating and maintaining the system. The development led to the fully automated Robogate system, based upon the Volvo Kalmar, which was the first group work system realized with an assembly line, and the Fiat Mirafiori concept--a system with group work and automated assembly in large series production scales.

In all 100 welding robots are being used, the polaric magnet control mechanism of which enable easy movement and working motions even within the smallest and tightest spaces of the vehicle chassis. The motions of the robot's arm are programmed step for step on a model chassis and then are contained in a memory bank. According to Digitron, multiple programs can be stored for various models.

These programs are derived from the central computer as a function of the chassis type channeled to the Robocarrier system in the automated operations. Simultaneously, the quality of the work at the individual welding points is controlled automatically. The completed, welded vehicle frames are then transported automatically to the conventional assembly line and the robocarrier then drives back to the loading station. While doing this the driverless floor transport vehicle passes the empty deck container in order to exchange its deck for a different vehicle type.

Sofim Foggia--a conglomerate firm of the Fiat, Alfa-Romeo and Saviem companies--has also pioneered new methods in the use of a robotrailer system (driverless floor transport vehicles) in the production and testing of diesel motors. The objective was the following: improving the design of the work site by eliminating labor processes that were connected to a specific period of time; reducing the monotony and the surrounding noise levels; and improving occupational safety; creating a new working structure which provides greater autonomy, more comprehensive coresponsibility, and greater leeway in arriving at decisions to the workers.

For this purpose a system was engineered and implemented by Digitron AG (Schindler Group) and its Italian licensed partner, Comau Industriale. The daily output of the automatic motor and testing system today is 700 motors in 15 hours. According to Sofim reports, 11 Robotrailers replace the usual assembly line systems, whereby the vehicles are equipped with replaceable batteries for two-shift operations. The motors to be checked are fastened at the end of the assembly line and then transported to the testing site. After completing a test process, they are then taken back for revisions or for delivery depending upon the test results.

The automobile industry is employing the inductive vehicles because of their flexibility for realizing time span connected assembly systems. According to information provided by Digitron, there are some examples for this: the assembly works of Volvo in Kalmar, where passenger vehicles are driven to 280 robocarriers by the individual working groups; the production of the Fiat 131 in Turin where the chassis is preassembled onto robocarriers in autonomous working groups and then is automatically screwed together to the coach.

The intensive advancement in the units now has led to a new generation of small vehicles according to Digitron's sales director H.R. Mueller. These small vehicles can also be used efficiently in complex high performance systems for the production of smaller component groups (motors, transmissions, household products). For this purpose, Digitron AG developed the Robomatic, a microprocessor controlled small vehicle in the lowest price class. Due to its compact structure (the width is about 60 centimeters), it can be used on extremeley small surfaces instead of ramjet roller lines or suspended transporters.

In the new Citroen engine plant in Metz, 250 Robomatics are being used as self-propelled assembly units for the 1000 motors to be assembled daily. As Miller stresses, along with the optimal working and environmental conditions, the fact that has been decisive for choosing this system is that not a single mechanical resetting mechanism is required along the entire assembly line of over 1,100 meters. The motor to be produced remains constantly connected to the engine carrier from the automatic emplacement station of the crank encasement to all working and buffer sites up to the final equipment station.

More human working conditions have resulted from the integration of flexible industrial robots into existing assembly line systems--as was already mentioned--at Fiat Mirafiori in Turin. Robots ate also used as essential subsystems in this facility for preparation, pre-assembly, and automatic bolting of the chassis to the coach. The assembly of the coach onto the chassis--one of the most important operations in automobile production--demands that both parts are connected to each other precisely with a leeway of only a few millimeters. The system performs all these jointing processes fully automatically then reviews them and indicates errors and shortcomings immediately on a screen.

The daily output rate is at 800 units in 15 hours. Thirty-two Robocarriers and five automatic bolting robots replace the usual assembly line systems. The chassis deck--just to sketch an important work process--is transported from the inductive vehicle to the corresponding bolting robot and then handed over to a lifting system. The workers load the robots with the corresponding bolts and the deck is then lowered. The coach waiting to be fitted is then lowered by means of an automatic centering device to the bolting robot. In less than 5 minutes, all joints are bolted together automatically. Thereupon, the automobile is handed over to the conventional assembly line for final assembly.

9527
CSO: 3102

SWEDEN

NEW PROCESS FOR LESS EXPENSIVE ETHANOL

Stockholm SVENSKA DAGBLADET in Swedish 29 Feb 80 p 13

[Article by Jan Ohlsson: "New Process Provides Cheaper Ethanol"]

[Text] Ethanol in the gas tanks. That is what a large proportion of Sweden's private automobiles could have in only a few years' time. A new process makes large-scale production of ethanol possible as an engine fuel. The raw material will be grain and sugar beets, among other things. The production method will use 70 percent less energy than previous ones.

The new method nevertheless means that production costs for ethanol will be cut by half.

The heat normally needed to boil ethanol escapes in the form of alcohol vapor. The vapor is normally cooled by cooling water in order to transform the alcohol into liquid form. This is an energy-intensive process.

Vapor Left

In the new process the alcohol vapors go to an electrically driven compressor which compresses them to an overpressure of 3.6 kilograms, after which the ethanol gas converts to a liquid. Remaining is the vapor itself, however, which can be used to heat new alcohol, that is to say a self-boiling process. If the electrically driven compressor is furthermore replaced by a steam turbine, it is anticipated that 70 percent of the production energy can be saved.

This is now to be tested on a larger scale in the old Karpalund sugar refinery. This is reported by Harald Skogman, director of Sorigona which has developed the new method for production of heat for the pharmaceutical industry. The raw material for this will be sugar beets.

But within Sweden there are even greater resources which can be utilized, primarily the 1 million tons of surplus production grain which we have, as well as potatoes.

This would be capable of yielding a production of 300,000 cubic meters of ethanol for automobile fuel in just a few years.

Altogether our passenger cars consume 5 million cubic meters of gasoline and an additional 2.5 million cubic meters of diesel fuel for commercial traffic.

"The advantage is still that we can produce a large amount of fuel rapidly within Sweden," says Ake Brandberg at Swedish Methanol Development, Inc. It would therefore be most useful as emergency fuel in a crisis, since producer gas can scarcely be regarded as reliable for our modern diesel vehicles.

Price a Disadvantage

"The disadvantage is the price. Despite the fact that methanol and ethanol today are taxed at largely the same rate as gasoline, ethanol will be twice as expensive to produce as gasoline."

"Methanol, on the other hand, will be just as 'cheap' as gasoline," Ake Brandberg maintains. "Methanol can also be produced from domestic raw materials, above all from the large amount of forest waste which would actually suffice to supply us with fuel. But although we know that we can get methanol from forest waste, peat and so on, that technology has not yet been developed today for large-scale production. On a time scale, ethanol is first."

An even more energy-economic use of forest waste and peat is to operate electric power plants with the raw material. Electric power can power for example electric automobiles. An electric car rolls further on the same amount of forest waste than a methanol car.

Only Inner City Traffic

"But," Ake Brandberg objects, "the electric car can only negotiate inner city traffic, not any long or heavy transports for which methanol thus has a future."

The advantage of both ethanol and methanol is that they can power today's engines without major conversions. In order to make the whole thing profitable, however, we must imagine conversion by a certain date for new production of cars to operate on methanol.

Ethanol, which will be developed first, can power the new engines with various mixtures of ethanol/methanol until methanol can take over completely.

In order to stimulate the development a necessary measure is probably to set the tax rate considerably lower for ethanol/methanol than for gasoline.

Nearly 3 million crowns have been spent on experimental development for planned test operation at the Karpalund sugar refinery.

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